Supplemental Environmental Impact Statement

Steller Sea Lion Protection Measures in the Federal Groundfish Fisheries Off Alaska

Implemented under the Fishery Management Plans for the
Groundfish of the Gulf of Alaska
and the
Groundfish Fishery of the Bering Sea and Aleutian Islands Area

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Abstract: The Gulf of Alaska and Bering Sea Aleutian Islands groundfish fisheries have been managed under fishery management plans since 1978 and 1981, respectively. The range of the Steller sea lion overlaps the waters where the fisheries are conducted. Under the Endangered Species Act, Steller sea lion west of Cape Suckling, Alaska, are listed as endangered; east of Cape Suckling they are listed as threatened. In the core region from the Kenai Peninsula to Kiska Island, counts of adult and juvenile Steller sea lions have declined by about 80% since the population size was estimated in the late 1950s. In 2000, a Biological Opinion prepared under Section 7 of the Endangered Species Act on all aspects of these fisheries concluded that fisheries for pollock, Pacific cod, and Atka mackerel, jeopardize the continued existence of Steller sea lions and adversely modify their critical habitat due to competition for prey and modification of their prey field. The fisheries must be modified and brought into compliance with all federal laws. Several alternative fisheries management proposals have been developed. Changes in management measures vary the degree and direction of impacts the fisheries have on marine mammals, seabirds, prohibited species, target fish species, and the marine habitat. The changes also have impacts on fishers, processors, and coastal communities. Enforcement considerations and management complexity are inextricably tied to regulations. This SEIS evaluates alternatives to mitigate potential adverse effects as a result of competition for fish between Steller sea lions under a no action alternative as well as other alternatives that would substantially reconfigure these fisheries. Impacts are disclosed, both significantly positive and significantly negative as required by the National Environmental Policy Act. A biological opinion prepared according to the Endangered Species Act is included for the preferred alternative.

Executive Summary

Introduction

The purpose of this supplemental environmental impact statement is to: (1) provide information on potential environmental impacts that could occur from implementing a suite of fisheries management measures such that the western population of Steller sea lions existence is not jeopardized nor its critical habitat adversely modified by the groundfish fisheries in the Gulf of Alaska (GOA) and the Bering Sea and Aleutian Islands (BSAI); and (2) meet the National Environmental Policy Act's purpose (40 CFR Section 1500.1) of fostering excellent actions and better decisions that are based on understanding the environmental consequences of actions.

The fisheries management measures considered in this supplemental environmental impact statement (SEIS) were designed to allow commercial groundfish fishing in the North Pacific while assuring that the fisheries would neither jeopardize the continued existence of both western and eastern Steller sea lion stocks, nor adversely affect their critical habitat. The triggering mechanism for this supplemental environmental impact statement is a series of issues and events involving the Endangered Species Act, the National Environmental Policy Act, the Magnuson-Stevens Act, the Consolidated Appropriations Act of 2001 (Public Law 106-554), the National Marine Fisheries Service (NMFS), the North Pacific Fishery Management Council (the Council), the fishing community, the conservation community, and the U.S. District Court for the Western District of Washington.

Background

The western population of Steller sea lions declined by over 70% since the 1960s when the population was estimated to be 170,000-180,000. Declines were first observed for the eastern Aleutian Islands and they then moved to both the east and west with large reductions throughout the Gulf of Alaska and Aleutian Islands. The western population has been declining steadily at an annual rate of approximately 5% per year during the 1980s and 1990s, with a large increase in the rate of decline in the late 1980s of about 12% per year; the eastern population has been stable or increasing slightly during these two decades. In 2000, the minimum population estimate for the western population of Steller sea lions in Alaska was 34,600 sea lions and the same estimate for the eastern population in Southeast Alaska in 1998 was 15,000 sea lions.

The causes of the decline of the western stock of Steller sea lions are not clearly understood, and experts agree that these causes have probably changed over time. The marked change in the rate and spatial extent of the decline over the past decade suggests that the factors that contributed most strongly to the rapid declines prior to the 1990s may not be the primary factors currently inhibiting the recovery of this stock. Those factors that contributed to the decline prior to 1990 can be attributed to commercial harvest of sea lions, entanglement of juvenile sea lions in commercial fishing gear, intentional shooting, subsistence hunting, and nutritional stress. Factors such as disease and predation may have had an influence in the rapid decline as well. Hypotheses to explain the continued decline of the western stock of Steller sea lions include nutritional stress due to competition with fisheries for prey, and/or changes in the ocean environment due to climate change and subsequent effects on forage fish populations, and an increase in predation by sharks and killer whales. Although data are insufficient to isolate nutritional stress of juveniles as the causal factor of the continued decline, it remains a viable hypothesis due to lack of contemporary data from all life stages of Steller sea lions in all seasons.

A starting point explaining the need for this analysis is the comprehensive Biological Opinion NMFS issued November 30, 2000. The 2000 Biological Opinion concluded that fisheries for walleye pollock, Pacific cod and Atka mackerel being managed under the fisheries regulations in effect in the year 2000, jeopardized the survival and recovery of Steller sea lions and adversely modified their critical habitat. The 2000 Biological Opinion included a reasonable and prudent alternative (RPA) that included, among other things, areas closed to trawling. If implemented in its entirety, the 2000 RPA would have had substantial adverse impacts to the fishing industry and fishing communities. In order to assure the ongoing federal action (conducting groundfish fisheries) was brought into compliance with the Endangered Species Act, NMFS would have had to implement the RPA by emergency rule for 2001. Federal legislation (Public Law 106-554) allowed for a phase-in of the RPA for the 2001 fisheries.

In December 2000, the North Pacific Fishery Management Council moved to not adopt NMFS's conclusions or RPA in the 2000 Biological Opinion. The Council's Scientific and Statistical Committee concluded that the 2000 Biological Opinion was scientifically deficient, prompting the Council to ask for two independent scientific reviews. One review would consist of an independent team of four scientists and the other review by the National Academy of Sciences; both reviews are now underway. The Council also began a longer term process to consider other measures that could replace the 2000 Biological Opinion RPA and allow fisheries to operate in such a manner that would not jeopardize the continued existence of Steller sea lion and would prevent adverse modification of their critical habitat. To assist in developing alternative measures, the Council established an RPA Committee that included members from the fishing community, the conservation community, NMFS, the Council's Scientific and Statistical Committee, and the Alaska Department of Fish and Game.

Alternatives Considered

At the June 2001 meeting, the Council had agreed to a set of five alternatives for analytical purposes, including an alternative developed by the Council's RPA Committee. Each alternative incorporated a wide variety of changes to existing fisheries management regulations. While these five alternative suites of management measures were considered in detail, three additional alternatives were considered and set aside because the measures they contained were integrated within the alternatives developed. Suggested fisheries management measures include: where closed areas would be set, when areas would be closed, what kinds of fisheries would be closed, how total allowable catch would be established, how total allowable catch would be divided into seasons, how total allowable catch would be divided into various areas, the setting of maximum daily catch limits for certain fisheries, dividing harvest limits between inside and outside critical habitat, the use of spawning biomass in determining allowable biological catch, and dividing fishing vessels into two fleets and assigning a season to each fleet. The five alternatives were developed using a combination of some or all of these management measures. Comparisons of the management measures associated with each alternative are shown in Table ES-1, with definitions of terms and acronyms found in Chapter 2, Section 2.3. Maps showing locations of various management measures for the five alternatives are included as Figures 2.3-1 through 2.3-8 in the map packet. The following is a brief synopsis of each.

Alternative 1 No action. Regulatory measures implemented by emergency rule, and designed to protect Steller sea lions, would expire. *Note this alternative is presumed to violate the Endangered Species Act.*

Alternative 2 The low and slow approach. This alternative is derived from the Draft Programmatic SEIS for the Alaska groundfish fisheries (NMFS 2001a). Essentially, the approach is to establish lower total allowable catch levels (TACs) for pollock, Pacific cod, and Atka mackerel, prohibit trawling in critical habitat, and implement measures to spread out catches through the year.

Alternative 3 The restricted and closed area approach. This alternative is the RPA detailed in the November 30, 2000, Biological Opinion. Essential elements of this approach are to establish large areas of critical habitat where fishing for pollock, Pacific cod, and Atka mackerel is prohibited, and to restrict catch levels in remaining critical habitat areas.

Alternative 4 The area and fishery specific approach. This alternative was developed by the Council's RPA Committee. This approach allows for different types of management measures in the three areas (AI, BS, and GOA). Essential measures include fishery specific closed areas around rookeries and haulouts, together with seasons and catch apportionments. Three options for closure areas are examined for this alternative.

Option 1: Chignik small boat exemption.
Option 2: Unalaska small boat exemption.
Option 3: Gear specific zones for GOA Pacific cod fisheries.

Alternative 5 The critical habitat catch limit approach. This alternative is derived from the suite of RPA measures that were in place for the 2000 pollock and Atka mackerel fisheries, and measures considered for the Pacific cod fishery that include seasonal apportionments and harvest limits within critical habitat. Essentially, this alternative limits the amount of catch within critical habitat to be in proportion to estimated fish biomass.

Environmental Effects of the Alternatives

This supplemental environmental impact statement provides a scientific and analytic comparison of the five alternatives, providing significance determinations of the environmental effects of each alternative on all important factors that might be affected by those alternatives. Direct, indirect and cumulative effects are considered. Significance is determined by considering the context in which the action will occur and the intensity of the action. The context in which the action will occur includes the specific resources, ecosystems, and human communities affected. The intensity of the action includes the type of impact (beneficial versus adverse), duration of impact (short versus long), magnitude of impact (minor versus major), and degree of risk (high versus low level of probability of an impact occurring). This supplemental environmental impact statement lists impacts as: significant (positive or negative), conditionally significant (positive or negative), insignificant or unknown. Criteria used for determining significance ratings are explained for each resource. The environmental impacts of the alternatives in comparative form, providing a basis for choice among options, are summarized in Table ES-2. Major conclusions about the direct and indirect effects of each alternative are highlighted below.

Effects on marine mammals

The effects of incidental catch and entanglement in marine debris was found to be insignificant under all alternatives for all marine mammals, except for killer whales where the effects are unknown. This is because the numbers of incidental takes and incidence of entanglement are at very low levels unlikely to affect marine mammals at the population level, and while reductions are desirable, even a rate of zero would not be significant at the population levels.

With respect to harvest levels of prey species, Alternatives 1, 4, and 5 which would alter TAC levels (and presumably harvest levels) the least, the anticipated effects were rated as conditionally significant negative for Steller sea lions, northern fur seals, and harbor seals (Alternatives 1 and 4 only) and as insignificant for other marine mammal groups. Alternative 2, which would reduce TAC levels the most and substantially lower the amount of pollock, Pacific cod, and Atka mackerel which could be taken in Steller sea lion critical habitat was rated as conditionally significant positive for Steller sea lions, humpback whales, and harbor seals, conditionally significant negative for northern fur seals, and insignificant for other marine mammals. Alternative 3, which would substantially reduce the harvest of prey species within Steller sea lion critical habitat was rated as conditionally significant positive for humpback whales, conditionally significant negative for northern fur seals, and insignificant for other marine mammals. Alternative 5 was rated conditionally significant negative for Steller sea lions and northern fur seals and insignificant for other marine mammals.

With respect to the temporal and spatial concentration of the fisheries, Alternative 1 was rated as conditionally significant negative for Steller sea lions, northern fur seals, and harbor seals, and insignificant for other marine mammals. Alternative 2 was rated conditional significant positive for Steller sea lions and harbor seals, conditionally significant negative for northern fur seals, and insignificant for other marine mammals. Alternative 3 was rated conditional significant positive for Steller sea lions, conditionally significant negative for northern fur seals and harbor seals, and insignificant for other marine mammals. Alternatives 4 and 5 were rated conditionally significant negative for northern fur seals and harbor seals, and insignificant for other marine mammals. Disturbance effects were rated as insignificant under all alternatives except for northern fur seals which are unknown.

Although many of the effects were rated as insignificant, this does not mean that the management measures contained in the alternatives would not have some beneficial impacts on local marine mammal populations. However these beneficial impacts on local populations could be offset by displacing fishing activities into other areas, and at a meta-population level are not expected to have a significant effect on marine mammal population trajectories. Management measures included in the alternatives were not analyzed with respect to the development of an experimental design to evaluate the efficacy of Steller sea lion protection measures. Alternatives 3 and 4, to a greater extent than the other alternatives, do contain management measures which could be useful in the development of such an experimental design.

Effects on commercial fish species

For walleye pollock and Pacific cod, effects from all five alternatives are predicted to be insignificant because they meet the following significance criteria: (1) they would not be expected to jeopardize the capacity of the stock to produce maximum sustainable yield on a continuing basis; (2) they would not alter the genetic sub-population structure such that it jeopardizes the ability of the stock to sustain itself at or

above the minimum stock size threshold; (3) they would not alter harvest levels such that it jeopardizes the ability of the stock to sustain itself at or above the minimum stock size threshold; (4) they would not alter harvest levels or distribution of harvest such that prey availability would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold; and (5) they would not disturb habitat at a level that would alter spawning or rearing success such that it would jeopardize the ability of the stock to sustain itself at or above the minimum stock size threshold.

For Atka mackerel, flatfish, rockfish, thornyheads, sablefish and other species analyzed, the effects from all alternatives are predicted to be either insignificant or unknown.

Effects on non-specified species

For Alternatives 1, 4, and 5 in the Bering Sea/Aleutian Islands, effects are predicted to be insignificant (less than 20% change) or unknown; for Alternatives 2 (low and slow) and 3 (restricted and closed areas) effects are predicted to induce conditionally significant positive effects (20 to 50% reduction) on jellyfish bycatch. In the Gulf of Alaska, jellyfish bycatch is predicted to result in a significant positive impact (greater than 50% reduction) from Alternative 2 and a conditionally significant positive impact from Alternative 3. Other non-specified fish, sessile invertebrates and mobile invertebrates are predicted to receive conditionally significant positive effects from Alternative 2.

Effects on forage fish

For all alternatives, effects are predicted to be insignificant (less than 20% change), except smelt bycatch is predicted to have conditionally significant positive effects (between 20% and 50% reduction) from Alternative 2 (low and slow) in both the Bering Sea/Aleutian Islands and the Gulf of Alaska, and significant positive effects (greater than 50% reduction) from Alternative 3 (restricted and closed areas) in the Gulf of Alaska.

Effects on prohibited species bycatch

In the Bering Sea, all alternatives are predicted to have insignificant effects (less than 50% reduction or no change in spatial/temporal concentration) for all species and issues, except for Alternative 2 (low and slow). Alternative 2 is predicted to induce conditionally significant positive effects (50% to 99 reduction) on Chinook salmon and other salmon bycatch, but would induce conditionally significant negative effects (50% to 99% increase) on the bycatch of herring and king crabs other than red king crab. In the Aleutian Islands, insignificant effects are predicted except for the following cases: (1) Chinook salmon are predicted to receive conditionally significant positive effects from all alternatives except Alternative 3 (restricted and closed areas), where conditionally significant negative effects are predicted; (2) herring are predicted to receive conditionally significant positive effects from Alternatives 2 and 3; and (3) other Tanner crab are predicted to have conditionally significant positive effects from Alternatives 2,3, and 4. For all alternatives in the Gulf of Alaska, and for all species and effects parameters, the effects are predicted to be insignificant.

Effects on Endangered Species Act listed Pacific salmon

All alternatives are predicted to have insignificant effects (less than 50% reduction in bycatch, no change in spatial/temporal concentration and no substantial difference in prey biomass removal), except for

Alternative 2 (low and slow). Alternative 2 is predicted to induce conditionally significant positive effects on Pacific salmon bycatch (50% to 99% reduction) in both the Bering Sea/Aleutian Islands and the Gulf of Alaska. These results are thought to be below a level at which Endangered Species Act consultation should be reinitiated.

Effects on seabirds

All alternatives are predicted to have unknown or insignificant effects (take number and/or rate is the same as 1993-1999 averages, prey availability is the same, impact to benthic habitat is the same, and availability of processing wastes is the same [all are qualitative estimates]) except for the following predictions: (1) a conditionally significant positive effect is predicted for the availability of processing wastes (wastes may be minimally increased) for the northern fulmar for all alternatives except Alternative 2 (low and slow), which is predicted to have an insignificant effect; and (2) all alternatives are predicted to induce a conditionally significant negative effect on incidental take for the short-tailed albatross (take number and/or rate may increase minimally).

Effects on marine habitat and other essential fish habitat

Alternative 1(no action) and 5 (critical habitat catch limits) are predicted to cause conditionally significant negative effects (moderate displacement in trawling effort) when evaluated for removal and damage to HAPC biota, except that all alternatives are predicted to have insignificant effects to non-living substrate by fixed gear. Alternative 2 (low and slow) is predicted to cause significant positive effects on removal of biota which forms living substrate by trawling (large increase in closed areas without displacement of effort elsewhere) and conditionally significant positive effects on removal of biota in habitat areas of concern by fixed gear (some increase in areas closed), modification to substrate by trawling (areas closed to trawling is greater) and changes to species diversity (area closed to trawl is greater). Alternative 3 (restricted and closed areas) is predicted to induce conditionally significant positive effects for the trawling questions (area closed to trawling is moderately greater), and conditionally significant positive effects on removal of biota in habitat areas of concern by fixed gear and for biodiversity change. Alternative 4 (area and fishery specific) is predicted to have conditionally significant negative effects on removal of biota (moderate displacement of trawling and longline effort), with insignificant impacts predicted for bottom substrate from fixed gear and for changes in biodiversity .

Effects on essential fish habitat (EFH) were evaluated for each alternative. All of the alternatives have the potential for regional adverse effects to EFH, or to a component of EFH such as certain biota known as habitat areas of particular concern (HAPC). Consultations on the effect of the preferred alternative on essential fish habitat were completed October 24, 2001, and no new mitigation measures were required.

Effects on the ecosystem

Predatory-prey relationships were assessed with four indicators: pelagic forage availability, spatial/temporal concentration of fishery on forage, removal of top predators, and introduction of nonnative species. All alternatives were predicted to induce significantly positive effects when considering pelagic forage availability (greater than 10% increase in pollock or other key forage abundance). While Alternative 1 (no action) is predicted to have conditionally significant negative effects on spatial/temporal concentrations of fishery on forage (probable increased temporal or spatial compression), all other alternatives would have

conditionally significant positive effects (probable decreased temporal or spatial compression). All alternatives are predicted to induce insignificant effects on removal of top predators (no change in trophic level of catch relative to trophic level of biomass). All alternatives are predicted to induce insignificant effects on the introduction of nonnative species (less than 10% change in total catch), except Alternative 1 where conditionally significant negative effects are predicted (greater than 10% increase in total catch).

Energy flow and balance is predicted to have insignificant effects from all five alternatives, as is functional diversity under biological diversity. Conditionally significant positive effects on species diversity is anticipated for Alternatives 2 through 5.

Effects on State of Alaska managed parallel fisheries

Assessing the effects of each alternative were analyzed for their impact on harvest levels during state waters parallel fisheries, and on levels of participation by vessel gear type and length. State waters parallel fisheries are those pollock, Pacific cod, and mackerel fisheries that occur within state waters during the open federal season.

For state parallel Pacific cod fisheries, Alternative 1 (no action) is predicted to induce insignificant effects (less than 20% change in catch) in all state waters examined. Alternative 2 (low and slow) is predicted to induce conditionally significant or significant adverse effects (greater than 50% decrease in harvest) in all areas (except Prince William Sound) and gear types (except jig). Alternative 3 (restricted and closed areas) is predicted to induce significant negative effects in all areas (except Prince William Sound) and gear types (some areas had insignificant effects for jig gear). Alternative 4 (area and fishery specific) is predicted to induce conditionally significant or significant adverse effects for all trawl fisheries, and a mix of effects in other gear types and areas. Alternative 5 (critical habitat catch limits) is predicted to have insignificant effects in Prince William Sound, but significant adverse effects for other areas and gear types (except jig gear).

For state waters parallel pollock fisheries, all alternatives are predicted to have insignificant effects in Prince William Sound and in the Aleutian Islands, but significant adverse effects for pollock fisheries in the Bering Sea and Gulf of Alaska. For state waters parallel Atka mackerel fisheries, all alternatives are predicted to have insignificant effects for jig and other gear types, but Alternatives 2, 3, and 4 are projected to have significant adverse effects for trawl catcher/processors.

Effects on management and enforcement

All alternatives are predicted to have significant negative effects on monitoring and enforcement (complex area boundaries are created and the number of directed fishing closures is increased), with Alternative 4 (area and fishery specific) being the most complex alternative. While Alternative 1 (no action) is predicted to induce insignificant effects on managing harvest within specified limits (no change in the number of quota categories or the size of quotas), all other alternatives are predicted to have significant negative effects on managing harvest within specified limits (an increase in the number of quota categories and a decrease in the amount of catch available in the quota categories), with Alternative 2 (low and slow) being the most complex alternative. The Regulatory Impact Review (Appendix C) states that NMFS Division of Enforcement estimates costs of approximately $552,000 per year associated with Alternatives 2 through 5

and NMFS Sustainable Fisheries Division estimates costs of $300,000 per year for Alternatives 2, 3, and 5 and $400,000 per year for Alternative 4.

Effects on the economic environment

The economic effects are grouped in the following categories: non-market impacts, industry costs and market impacts, and indirect impacts. Non-market impacts impacts are those elements of economic value in society that are not explicitly traded in the marketplace. Economic impacts that directly affect the commercial fishing industry are classified as industry costs and market impacts and include impacts to harvests and product prices, changes in operating costs, and effects on groundfish market values. Economic consequences that are attributable to the alternatives but not directly associated are considered indirect impacts and they include safety costs, impacts to related fisheries, costs to consumers, excess capacity, and prohibited species catch.

In the case of the Steller sea lion protective measures, non-market impacts include existence value, subsistence value, and benefits associated with eco-tourism. Existence value refers to the benefit that individuals in society gain just from knowing that Steller sea lion populations are stable and flourishing in their natural environments. Two specific impacts to subsistence harvests are that declining numbers of Steller sea lions will increase the costs of subsistence harvests, and fewer sea lions are likely to be harvested in total. Eco-tourism centered around Steller sea lions include impacts to tourists and those involved in providing services to those persons. For all three components of non-market impacts, each alternative is found to provide conditionally significant positive impacts. The exception is the no-action alternative (Alternative 1), which provides a conditionally significant negative impact.

Impacts to harvest levels, price effects, and gross revenues, address catch levels and total revenue changes that could be anticipated from the alternatives. Positive and negative changes in revenue are attributable to reductions in the level of catch and the accompanying impacts on prices and within the market for products processed from the harvested fish. An economic model was developed to address the "first wholesale" gross revenue changes to the several affected fishing sectors, and for each alternative. The total revenue associated with adoption of Alternative 2 represents the worst-case situation as measured against the 'no action' baseline case, and a significantly negative impact associated with Alternative 2. The model suggests a lesser, but also significantly negative, impact for Alternative 3. Alternative 4 has an insignificant impact, while Alternative 5 has a relatively small (conditionally significant) negative impact.

Operating cost impacts affect the fishing industry directly as increased costs per unit of harvest. They include items such as increased travel time to and from more distant fishing grounds, costs of learning new fishing grounds, reduced catch per unit of fishing effort due to less concentrated stocks, costs of stand downs and lay-ups, and costs to processing facilities built for higher rates of throughtput. In general, all alternatives will impose operational changes that will increase costs to fishing vessel operators.

Impacts on markets for pollock, Pacific cod, and Atka mackerel are measured as the changes in prices and product revenues associated with the alternatives. This includes product prices, quantities, volumes, product forms, market share, and balance of trade considerations. An analysis of the markets concluded that, although the impacts varied in quantity by harvested species and product form, the alternatives would have uniformly similar effects regardless of the species. In particular, Alternative 2 would result in rather significantly negative impacts to markets for pollock, Pacific cod, and Atka mackerel. Although prices for product forms would likely rise, the losses in sales volumes would not be sufficient to compensate the

industry. Alternative 4 (the only other alternative examined in detail in the market analysis) would have a relatively small effect on the markets of most of the product forms, and have an overall insignificant impact. By interpolation, these results are extended to Alternatives 3 and 5. Both are evaluated to also be significantly negatively impacted.

Safety costs or factors include fishing further offshore, during periods of extreme weather, and on more exposed or remote grounds, and considers the relationship between safety and reduced profitability. Several of the alternatives contain provisions which seek, either directly or indirectly, to accommodate the differential capacities and characteristics of the fleets operating in the regulated fisheries, such as explicitly exempting smaller vessel classes from an area restriction. A qualitative assessment suggests that governing the timing and fishing area restrictions, contained in Alternatives 2, 3, and 5, would force vessels to fish further offshore and/or during periods when operating conditions are potentially more extreme. Alternative 4 would, by comparison, reduce these likely effects. Because of the difficulty in measuring safety impacts, they are considered conditionally significant adverse for all the alternatives.

Impacts to related fisheries include those spillover effects such as increases in non-target catches of Pacific cod and pollock, effects of displacing capacity from SSL regulated fisheries, increased costs of gearing up associated with pre-season planning uncertainty; implications and opportunities for topping off behavior; and increased bait costs in crab fisheries. Each of the alternatives has been determined to have an unknown impact ranking because it was not possible to determine a net result of these complex, interrelated effects.

Costs to consumers, or impacts felt through product market channels through to the U.S. consumer level, were analyzed as a part of the market analysis. The market analysis determined that the impact varied by product form, and would be most noticed by consumers of pollock and Pacific cod fillets, and by the select market of surimi in the U.S. In these cases, prices to consumers in the U.S. will rise slightly if the quantity of pollock and Pacific cod is reduced by the respective alternatives. The remainder of products are almost entirely exported and would not affect U.S. consumers. The impact of Alternative 2 was ranked as having a conditionally significant adverse impact. Alternative 4 was ranked as having an insignificant impact. By interpolation, Alternative 3 ranks as having a conditionally significant negative impact (similar to Alternative 2) and Alternative 5 ranks as having an insignificant impact (similar to Alternative 4).

Excess capacity relates to the aggregate impact of a fixed amount of capital equipment among the fishing and processing sectors, but operating under a reduced harvest regime. There is no available quantification of net changes or shifts within these sectors that would likely occur, but changes imposed under at least Alternatives 2, 3 and 5 will result in excess capacity in the harvesting sector. Nevertheless, the alternatives would have an unknown impact.

Bycatch and associated avoidance measures have the potential to increase vessel operating costs. There is no quantitative method to relate the biological findings of prohibited species catch impacts, by alternative, to economic costs to fishing operations, nor is there a quantitative evaluation of the impacts that the different alternatives will have upon fish discards. The fishing restrictions imposed under each of the alternatives may result in fishermen having to fish in waters that have previously not been fished. The results of this change are not known, but it is reasonable to assume that at least some of the fishing activity in new areas will result in greater discards of non-target species. The extent of the effect leads to an unknown impact from the alternatives.

Effects on the social environment

The socioeconomic effects of implementing Steller sea lion protection measures were assessed for the federally managed commercial pollock, Pacific cod and Atka mackerel fisheries in terms of 21 socioeconomic indicators by region. Summary comparisons were made of Alternatives 2 and 4 with Alternative 1 for four of these indicators, vessel safety and the non-market values of Steller sea lions and other living marine resources. These alternatives were selected for the summary comparisons because Alternative 1 is the no action alternative and because compared to Alternative 1, Alternatives 2 and 4, respectively, are projected to have the largest and smallest effects on the four indicators.

The summary comparisons (shown in Table ES-3) are made for the high and low estimates for these four indicators and three alternatives. Both Alternatives 2 and 4 may cause disproportionate socioeconomic effects on some regions. For example, Alternative 2 is predicted to cause between 31% and 55% reductions in catcher vessel total harvests of pollock, Pacific cod and Atka mackerel across all regions, but is predicted to cause between 54% and 80% reductions in regionally owned catcher vessel harvests in the Alaska Peninsula/Aleutian Island region. The decreases in total harvesting and processing payments to labor and employment accruing to this region from the pollock, Pacific cod and Atka mackerel fisheries are also disproportionately large. For the Kodiak region, the predicted decrease is disproportionately large for each of the four indicators.

Alternative 4 is predicted to cause 5% to 9% reductions in catcher vessel harvest of pollock, Pacific cod and Atka mackerel across all regions, but is predicted to cause 7% to 17% and 9% to 15% reductions in regionally owned catcher vessel harvest in the Alaska Peninsula/Aleutian Island and Oregon Coast regions, respectively. Likewise, across all regions, Alternative 4 is predicted to cause reductions in total ex-vessel value of pollock, Pacific cod and Atka mackerel of between 1% and 6%, but the Kodiak region is predicted to lose between 3% and 12%.

Specific fisheries within specific regions may experience disproportionate impacts relative to the total fishery in that region. For example, under Alternative 4, a disproportionate impact can be seen in the Alaska Peninsula/Aleutian Island, where harvest reductions to regional owned catcher vessels are predicted to drop between 7% and 17%, but the Pacific cod harvest is predicted to drop between 17% and 26%. Other disproportionate fisheries specific impacts can be found by examining the data tables in Chapter 4, Section 12 of this SEIS.

Regarding safety at sea, Alternative 2 is predicted to have the largest operational changes (e.g., transit greater distances between port and open fishing grounds, fish farther offshore, and aggravate the race for fish). And therefore, Alternative 2 is expected to have a high potential to increase the risk of accidents and injury per unit of catch. However, this adverse effect will be offset, at least in part, by the substantial reductions in catch that would occur with this alternative. Alternative 4 reduces some requirements which force effort farther offshore (especially for the smaller vessels) and should, therefore, impose a relatively lower risk of accident and injury, to the extent that occurrence of accidents and injuries are highly correlated with fishing distance offshore, weather and sea conditions, and vessel size.

Given the lack of availability of precise information, it is not possible to distinguish degrees of positive subsistence impact among the alternatives, either to order them or to determine whether or not such theoretically positive impacts would rise to a level of significance. Logically, those which reduce

commercial groundfish harvest the most would have the most potential benefit for the subsistence use of Steller sea lions and other living marine resources. Therefore, Alternatives 2 and 4 would be expected to provide increased subsistence use values compared to Alternative 1.

Although the other non-market values of Steller sea lions and other living marine resources are thought to be substantial, the difference in these values among the alternatives is not known. That uncertainty is due, in part, to our limited ability to predict the degree to which the various alternatives affect the probability of either the recovery or extinction of Steller sea lions. However, as with subsistence value, the other non-market values would be expected to be higher for alternatives that decrease the probability of extinction or increase the probability of recovery.

Cumulative effects

The analysis of cumulative effects addressed the synergistic and incremental effects of past, present, and future external actions on the action alternatives Steller sea lions and groundfish fisheries. External actions evaluated can include those of the NMFS, other human controlled events, and natural events. Cumulative effects were examined for marine mammals (including the Steller sea lion and northern fur seal), target groundfish species (including the pollock, Pacific cod, and Atka mackerel) and other species, non-specified fish species, forage fish, prohibited species, ESA listed Pacific salmon, seabirds, benthic habitat and essential fish habitat, the ecosystem, social, and economic indicators. In order to compare and evaluate incremental and synergistic effects for each of these topics, the cumulative effects analysis uses the same categories and significance criteria used to analyze potential direct and indirect effects. Cumulative effects are summarized below:

For the Steller sea lion: Cumulative effects for incidental take or entanglement and disturbance were considered to be insignificant for all alternatives. Cumulative effects for prey availability were considered to be conditionally significant adverse for all five alternatives. Cumulative effects for spatial and temporal harvest of prey were identified as conditionally significant adverse for four of the five alternatives; only Alternative 2 was noted as insignificant.

For the northern fur seal: Cumulative effects for spatial and temporal harvest were considered to be conditionally significant adverse for all five alternatives due to potential redistribution of fishing effort into areas important to northern fur seals. Cumulative effects for prey were identified as conditionally significant adverse for Alternative 5 and insignificant for the other Alternatives 1 through 4.

For the three target groundfish species: Cumulative effects were identified for fishing mortality, habitat suitability, and prey availability for pollock and Pacific cod in the eastern Bering Sea and Aleutian Islands (BSAI), and the Gulf of Alaska (GOA), but were considered insignificant for all five alternatives. Cumulative effects were identified for habitat suitability and prey availability for Atka mackerel in BSAI, but were considered insignificant for all five alternatives. Cumulative effects were noted for fishing mortality, spatial and temporal concentration, habitat suitability, and prey availability for Atka mackerel in the GOA; however, the significance of each of these effects is unknown at this time.

For habitat effects: Cumulative effects were identified from removal and damage to HAPC by both mobile and fixed gear. Effects from mobile gear were considered conditionally significant beneficial for Alternative 2, insignificant for Alternative 3, and conditionally significant adverse for Alternatives 1, 4, and 5. Effects

from fixed gear were considered conditionally significant adverse for Alternatives 1, 4, and 5, and insignificant for alternatives 2 and 3. Cumulative effects were identified from modification of non-living substrate, damage to epifauna and infauna by mobile and fixed gear. Effects from mobile gear were considered conditionally significant adverse for Alternatives 1 and 5, and insignificant for Alternatives 2, 3, and 4. Effects from fixed gear were considered insignificant for all alternatives. Cumulative effects were identified for habitat subject to biodiversity reduction; these effects were considered conditionally significant adverse for Alternatives 1 and 5, and considered insignificant for Alternatives 2, 3, and 4.

For ecosystem effects: Cumulative effects were identified as conditionally significant adverse under Alternative 1 for predator-prey relationships, and considered insignificant for all other alternatives. Cumulative effects for energy flows and balance were considered insignificant for all alternatives. Cumulative effects for biological diversity included a mixture of conditionally beneficial, adverse and in significant effects, depending on specific species and areas affected.

For socioeconomic effects: Cumulative socioeconomic effects for the five alternatives were examined in relation to selected factors public resource value, fishing industry, and community characteristics. Regarding public resource values, cumulative effects were identified as conditionally significant adverse or unknown for Alternative 1. Given the external factors, however, improvements from protection measures in Alternatives 2 through 5 resulted in cumulative effects considered as insignificant.

Regarding cumulative effects on the fishing industry, cumulative effects on excess capacity were identified as conditionally significant adverse for all alternatives. Cumulative effects on operating costs are also considered conditionally significant adverse for all alternatives, with the exception of Alternative 1 which is insignificant. Shore-based harvesters and processors in the BSAI and GOA that are interdependent on other fisheries such as salmon and crab would experience greater impacts. Cumulative effects on vessel safety are identified as conditionally significant adverse for Alternatives 2, 3, and 5, which require additional travel by smaller catcher vessels to areas open for to fishing. Cumulative effects on vessel safety for Alternative 1 and 4 are insignificant overall. Cumulative effects on harvest value/fish price and on product quality/revenue impacts are identified as conditionally significant adverse for Alternatives 2, 3, and 5, but insignificant for Alternatives 1 and 4. Cumulative effects on management and enforcement costs are identified as conditionally significant adverse for Alternatives 2, 3, and 4, but insignificant for Alternatives 1 and 5.

Overall trends in other state and federal fisheries result in conditionally significant adverse effects for all alternatives, particularly for the Aleutian Island/Alaska Peninsula and Kodiak Island regions whose economies are highly dependent on the fishing industry. Conditionally significant adverse cumulative effects are of a greater magnitude for Alternatives 2, 3, and 5, due to change in patterns in temporal and spatial closures that impact smaller vessels with limited options for redistributing fishing effort and having a greater potential for revenue at risk.

Comparison of the Alternatives

No differences (trade-offs) were found among Alternatives 1 through 5 in effects on four marine mammals (unlisted cetaceans, northern fur seals, other pinnipeds, and sea otters), on all 11 target commercial fish species (pollock, Pacific cod, Atka mackerel, flatfish, other flatfish, Pacific Ocean perch, red rockfish and other rockfish, thornyheads, sablefish, and squid and other species), on one prohibited species bycatch (in

GOA), on five seabirds (short-tailed albatross, other albatrosses and shearwaters, piscivorous seabirds, eiders, and other seabird species), and one of three components of ecosystems (energy flow and balance).

Some differences are shown for the effects of Alternatives 1 through 5 on resources, species, species groups, or effect parameters that are not central issues in this specific decision process related to the RPA for the Steller sea lion. Further, the actual effects shown range from U to CS- to I to CS+. The issues in this category include Endangered Species Act (ESA) listed cetaceans, harbor seals, non-specified fish species, forage fish, prohibited species bycatch in the Bering Sea (pollock and Pacific cod), prohibited species bycatch in the Aleutian Islands (Atka mackerel), ESA listed Pacific salmon, Norther fulmar, and marine benthic habitat and other essential fish habitat.

Some differences are shown for the effects of Alternatives 1 through 5 on four resources, species, species groups, or effect parameters that are central issues in this decision process (Steller sea lions, predator-prey relationships, diversity, and economic indicators). It should be recognized that effects on pollock, Pacific cod, and Atka mackerel also influence Steller sea lions; however, as noted above, all five alternatives are depicted as having insignificant (I) effects on these target commercial fish species.

Alternatives 2 and 4 are further compared because they seemed to be of the most interest by testimony comments at Council meetings and written comments on the draft SEIS. Alternative 1was not considered a viable option due to its potential noncompliance with RPA requirements to adequately address "jeopardy and adverse modification" for Steller sea lions. Alternatives 3 and 5 can be set-aside in this final analysis due to lesser interest in these options by the Council and general public. Re-examination of the trade-offs between Alternatives 2 and 4 in relation to the four issues listed in above reveal that there are no trade-offs (differences between these two alternatives) for predator-prey relationships and diversity. Examination of the remaining effects parameters for Steller sea lions and economic indicators reveal that trade-offs are displayed for only four parameters (harvest of prey species and spatial/temporal concentration of fishery for the Steller sea lion; and the economic indicators listed as harvests and fish prices, and costs to consumers).

Under alternative 2, conditionally significant positive effects would occur on the harvest of prey species and the spatial/temporal concentration of the fisheries; as a result, it is presumed that a "no jeopardy and no adverse modification" opinion would be rendered by the NMFS for the Steller sea lions. The social and economic analysis of alternative 2 indicated that significant negative effects would occur on harvest and fish prices for target groundfish species and conditionally significant negative effects would occur in relation to costs to consumers. The four socio-economic comparisons shown in Table ES-3 depict overall losses of between 28 to 61 percent, further, the losses are not evenly distributed based on the analysis of six geographical regions (the losses range from 23 to 80 percent depending upon the comparison and region). Conditionally significant negative cumulative effects would occur for prey availability for the Steller sea lion; and likewise for harvests and fish prices, product quality and revenue impacts, operating cost impacts, safety impacts, costs to consumers, management and enforcement costs, and excess capacity.

Under Alternative 4, conditionally significant negative effects would occur on the harvest of prey species for the Steller sea lion, and insignificant effects would occur on the spatial/temporal concentration of the fisheries; a "no jeopardy and adverse modification" opinion has been obtained from the NMFS (see 2001 Biological Opinion and Incidental Take Statement in Appendix A), and four reasonable and prudent measures have been identified as monitoring requirements to document the effectiveness of Alternative 4 in this regard. Insignificant effects would occur on harvest and fish prices for target groundfish species, and

in relation to costs to consumers. The four socio-economic comparisons shown in Table ES-3 depict losses of between less than 1% to 6%, further, the losses are not evenly distributed based upon the analysis of six geographical regions (the losses range from zero to 17 percent depending upon the comparison and region). Conditionally significant negative cumulative effects would occur for prey availability for the Steller sea lion and the spatial and temporal harvest of prey; likewise, such negative effects would also occur for operating cost impacts, and excess capacity

Identification of the Preferred Alternative

In the Draft SEIS released in August 2001, NMFS identified Alternative 4 as its preliminary preferred alternative. As part of the NEPA process undertaken following the comprehensive biological opinion and Council rejection of the associated RPA, it was the expectation that if an alternative could be formulated that was found to be in compliance with ESA and other federal laws and Executive Orders, and not be as economically costly as the RPA in the NMFS 2000 Biological Opinion, it would be designated the preferred alternative. Alternative 4 appears to prove that it is possible, thus it is designated the preferred alternative for purposes of the draft environmental impact analysis. Further, NMFS reinitiated Endangered Species Act Section 7 consultation for these fishery management measures, resulting in a draft Biological Opinion and Incidental Take Statement on the measures contained in Alternative 4, and the draft Biological Opinion was included as Appendix A in the draft SEIS. The Draft Biological Opinion contained a finding of no jeopardy and no adverse modification of critical habitat for Alternative 4. NMFS also attached a "Dear Reviewer" letter to the Draft Biological Opinion that requested the RPA Committee and the Council to critically review, assess, and evaluate the need for critical habitat harvest limits and seasonal harvest rates.

The RPA Committee met on August 23-24, 2001 to review the Draft Biological Opinion and the Draft SEIS. Although the Draft Biological Opinion found no jeopardy, the Committee recommended that the measures be slightly modified to include additional spatial and temporal fishery restrictions as part of Alternative 4 in response to the NMFS concerns. For BSAI cod fisheries, additional area closures would apply to Bering Sea longline fisheries, and the Bering Sea cod trawl fishery would be spread out over 3 seasons with differing apportionments for catcher vessels and catcher-processors. The Bering Sea pollock fishery would be modified by adding a more restrictive catch limit in the SCA.

The Council reviewed the Draft SEIS, Draft Biological Opinion, and RPA Committee recommendations at its meeting on September 5-9, 2001, to ensure that it had adequate time to fully consider the proposed management measures and NMFS' analysis under Section 7. The Council adopted Alternative 4 (including the recommendations of the RPA Committee for additional Steller sea lion protection measures) as its preliminary preferred alternative.

At its October 2001 meeting, the Council undertook its final review of the Draft SEIS and Draft Biological Opinion. The Council adopted Alternative 4 with the additional measures to protect Stellar sea lions including: a reduction in the critical habitat catch limit for Atka mackerel, a total closure of the Aleutian Islands pollock fishery, and a vessel monitoring system requirement for all vessels (except vessels using jig gear) fishing for pollock, cod, or Atka mackerel. Option 2 of Alternative 4 was also adopted to allow a limited Pacific cod fishery by longline catcher vessels on the west side of Unalaska Island. In choosing it's preferred alternative, the Council noted that Alternative 4 was precautionary response to concerns about Steller sea lions and that these management measures would neither jeopardize the continued existence of the western stock of Steller sea lions nor modify their critical habitat. Further, the Council noted that

Alternative 4 better met the Magnuson-Stevens Fishery Conservation and Management Act mandates, especially with regards to safety at sea, minimizing bycatch, minimizing impacts to fishing communities, and attainment of optimum yield.

The final Biological Opinion, dated October 19, 2001, concludes this suite of management measures would not likely jeopardize the continued existence of the western or eastern populations of Steller sea lions, nor would it adversely modify the designated critical habitat of either population. It is important to point out that the October 2001 Biological Opinion does not ask if Alternative 4 helps the Steller sea lion population size recover to some specified level so that the species could be delisted, but rather asks if Alternative 4 will jeopardize the Steller sea lion's chances of survival or recovery in the wild. While the Biological Opinion has concluded that Alternative 4 does not jeopardize the continued survival and recovery of Steller sea lions, it none-the-less identified four reasonable and prudent measures to include with Alternative 4 as necessary and appropriate to minimize impacts of the fisheries to Steller sea lions. The measures are: (1) monitoring the take of Steller sea lions incidental to the BSAI and GOA groundfish fisheries; (2) monitoring all groundfish landings; (3) monitoring the location of all groundfish catch to record whether the catch was taken inside critical habitat; and (4) monitoring vessels fishing for groundfish inside areas closed to pollock, Pacific cod and Atka mackerel to see if they are illegally fishing for those species.

Areas of Controversy

The whole issue regarding the effects of fishing on Steller sea lion is controversial. Some environmental groups have argued that fisheries compete with Steller sea lions for prey, and that this competition reduces the survival of Steller sea lions resulting in continued decline. Members of the fishing community argue that the fishing industry is not responsible for the decline of Steller sea lions, but rather other factors (e.g., climate change, predation by killer whales) are to blame. The controversy is further fueled by the lack of evidence linking fisheries with effects on Steller sea lions, combined with the Endangered Species Act requirements relative to burden of proof.

Issues to be Resolved

All five alternatives analyzed herein, including the preferred alternative (Alternative 4), include 3 nm no-transit zones around principal rookeries for the Steller sea lion. Many such rookeries occur in State of Alaska waters. No-transit zones have the effect of closing some Alaska State waters to directed fishing for groundfish. Further, questions have arisen as to the use of federal fisheries permits, and the practice of returning them to NMFS to enable fishing in State waters, and then the re-applications for such permits, all possibly occurring several times in a given year. The legal and policy implications of such practices, and their effect on State-managed waters, must be more thoroughly addressed and understood in implementing the preferred alternative. Several options for implementation are being developed; further, the implications of the options are considered in relation to the "no jeopardy and adverse modification" opinion of NMFS in their Section 7 Consultation under the Endangered Species Act (Appendix A). NMFS has worked with the State of Alaska to satisfactorily resolve these implementation issues.

A second unresolved issue is related to experimental research programs and their design, and the conducting of broad-scale monitoring programs. An on-going experimental program which began in the late 1990s is testing the efficacy of no-trawl zones in relation to the possible effects of fishing on prey abundance and distribution relative to the Steller sea lion. A study at Sequam Island is addressing Atka mackerel issues, and

a second study at Chiniak Island near Kodiak Island is addressing pollock biology. Both studies are designed to determine whether fisheries result in localized depletion of the target fish, and if so, whether or not Steller sea lions may be compromised because of the depletion of prey.

Relative to experimental programs specifically associated with Alternative 4, the Council has contracted with a four-person international team of scientists to review the NMFS 2000 Biological Opinion regarding its underlying scientific information, assumptions, and hypotheses. One specific task is to recommend an appropriate experimental design to improve the current understanding of the interactions between fisheries and Steller sea lions, and the efficacy of imposed management measures to promote recovery of the Steller sea lion population. The report from the team was received in September, 2001. The team will continue to meet during the fall as an experimental design and related monitoring program is developed for the preferred alternative. The Council's Science and Statistical Committee (SSC) has indicated that an adequate experimental design can be developed within the context of the preferred alternative. The SSC noted that the design must follow solid scientific principles, including testable hypotheses and the evaluation of assumptions. Further, the design should include the power to detect differences in trends.

In addition to the experimental programs that NMFS is conducting, other agencies' and universities' research projects are being funded to examine various facets of Steller sea lion ecology and possible causes of the decline in populations. Numerous research programs are described in the 2001 Biological Opinion and Incidental Take Statement for Alternative 4. Over time, it is anticipated that these research findings will contribute to an increased understanding of Steller sea lion biology and the effectiveness of the management measures included in the preferred alternative.

In order to be exempt from the prohibitions of section 9 of the ESA, NMFS must comply with the following terms and conditions, which implement the reasonable and prudent measures. These terms and conditions are non-discretionary.

1. NMFS will monitor the take of Steller sea lions in the pollock, Pacific cod and Atka mackerel fisheries. NMFS-trained observers on vessels in these fisheries will be deployed under the existing program for observer coverage based on vessel size and sector. NMFS will use observer data to make minimum estimates of mean annual mortality for each fishery. NMFS will evaluate the observer coverage that results from existing regulatory requirements to determine if changes in coverage are warranted to better assess take of Steller sea lions.

2. NMFS will monitor vessel location and compliance with gear and directed fishing restrictions for the pollock, Pacific cod and Atka mackerel fisheries. NMFS will implement a Vessel Monitoring System for all vessels in the pollock, Pacific cod and Atka mackerel fisheries that are subject to restrictions on directed fishing in rookery, haulout, or foraging area zones. NMFS will require electronic vessel logbooks or other recordkeeping and reporting measures necessary to monitor directed fishing.

3. NMFS will monitor harvest of pollock, Pacific cod and Atka mackerel. Monitoring of harvest of these species will be sufficient to account for the amount of fish harvested and to determine appropriate fishery closures by sector, gear type or area.

4. NMFS will manage critical habitat harvest limits using conservative management strategies to minimize the likelihood of exceeding a critical habitat harvest limit. Conservative management strategies shall include:

   If any part of an observed haul or set, or an unobserved vessel trip, occurs inside critical habitat, the entire catch will be counted against the critical habitat harvest limit.

   If VMS data are missing for a vessel in a fishery subject to a critical habitat harvest limit, the catch will be counted against the critical habitat harvest limit.

   If critical habitat harvest limits are small relative to the amount of fishing effort, NMFS will calculate the fishery closure date based on estimates of maximum harvest capacity, and pre-announce the closure date.

Table ES-1 Comparison of management measures under the alternatives.

Management Measures	Alternative 1 No Action	Alternative 2 Low and Slow Approach	Alternative 3 Restricted and Closed Areas	Alternative 4 Area and Fishery Specific Approach	Alternative 5 CH Catch Limit Approach
Control Rule	Amendment 56 Tiers	TAC set as a % of maximum ABC	NMFS 2000 Biological Opinion Global Control Rule	Modified Global Control Rule - no directed fishing if biomass < B20%.	Amendment 56 Tiers
No Transit Zones	3 nm no-transit zones around principal rookeries	3 nm no-transit zones around principal rookeries	3 nm no-transit zones around principal rookeries	3 nm no-transit zones around principal rookeries	3 nm no-transit zones around principal rookeries
Area Closures	No trawling 10/20 nm from 37 rookeries	Prohibit all trawling in CH/RFRPA; AI closed to pollock fishing	All CH/RFRPA sites designated as restricted or closed to fishing for pollock, cod, and mackerel	Specified closures around rookeries & haulouts by fishery, area, and gear type; SBSRA closed to pollock fishing; area 4, area 9, and Seguam closed to directed fishing for pollock, cod, and mackerel. AI closed to pollock fishing in 2002.	No pollock fishing in AI area; no trawling 10/20 nm from 37 rookeries
Season Closures	No trawling 1/1 to 1/20	No trawling 1/1to 1/20; no trawling for pollock 11/1 to1/20	No trawling 1/1 to 1/20; no trawling for pollock, cod, or mackerel 11/1 to 1/20; no fishing for pollock, cod, or mackerel inside CH 11/1 to 1/20	No trawling 1/1to 1/20; closure period between GOA pollock seasons; no trawling for pollock or cod 11/1 to 12/31	No trawling 1/1 to 1/20; no trawling for pollock 11/1 to1/20

Table ES-1 Comparison of management measures under the alternatives (cont.).

Management Measures	Alternative 1 No Action	Alternative 2 Low and Slow Approach	Alternative 3 Restricted and Closed Areas	Alternative 4 Area and Fishery Specific Approach	Alternative 5 CH Catch Limit Approach
Seasons and Apportionments pollock	BSAI - 1/20 (45%), 9/1 (55%); GOA - 1/20 to 4/1 (25%), 6/1 to 7/1 (35%), 9/1 to 12/31 (40%)	Four seasons evenly distributed over year with 25% of TAC each season	BSAI - 1/20 (40%), 6/11 (60%); GOA - 1/20 (40%), 6/11 (60%)	AI - 1/20 (100%); BS 1/20 (40%), 6/11 (60%); GOA - 1/20 to 2/25 (25%); 3/10 to 5/31 (25%), 9/25 to 9/15 (25%), 10/1 to 11/1 (25%)	BSAI - 1/20, 4/1 (40%), 6/10, 8/20 to 11/1 (60%); GOA - 1/20 to 3/1 (30%), 3/15 to 6/1 (15%); 8/20 to 9/15 (30%), 10/1 to 11/1 (25%)
Seasons and Apportionments cod	BSAI trawl - 1/20 BSAI fixed -1/1, 5/1, 9/1 GOA trawl -1/20 GOA fixed - 1/1	Four seasons evenly distributed over year with 25% of TAC each season	BSAI - 1/20 (40%), 6/11 (60%); GOA - 1/20 (40%), 6/11 (60%)	BSAI trawl - 1/20-3/31 (60%), 4/1-6/10 (20%), 6/10-10/31 (20%) BSAI longline- 1/1 (60%), 6/11 (40%) BSAI pot - 1/1 (60%), 9/1 (40%) GOA trawl - 1/20 (60%), 9/1 (40%) GOA fixed - 1/1 (60%), 9/1 (40%)	BS trawl + fixed - 1/20 to 4/30 (40%), 5/1 to 11/1 (60%) AI trawl + fixed - 1/20 to 4/30 (40%), 5/1 to 11/1 (60%) GOA trawl + fixed - 1/20 to 4/30 (40%), 5/1 to 11/1 (60%)
Seasons and Apportionments mackerel	AI - 1/20 to 4/15 (50%), 9/1 to 10/31 (50%)	Four season evenly distributed over year with 25% of TAC each season	BSAI - 1/20 (40%), 6/11 (60%); GOA - 1/20 (40%), 6/11 (60%)	AI - 1/20 to 4/15 (50%), 9/1to 10/31 (50%)	AI - 1/20 to 4/15 (50%), 9/1 to 10/31 (50%)
Catch Limits Inside CH	Akta mackerel: incremental change to limit of 40% inside CH in 2002	Foraging area catch limits for fixed gear fishing for Pacific cod	Pollock, cod, and mackerel: 4 seasons (1/20, 4/1, 5/11 8/22) inside CH/RFRPA with catch limits based on season and area	A season pollock harvest in SCA limited to 28% of annual TAC prior to April 1	Mackerel: incremental change to 40% inside CH and 60% outside in 2002 BSAI Pollock: maximum

Table ES-1 Comparison of management measures under the alternatives (cont.).

Management Measures	Alternative 1 No Action	Alternative 2 Low and Slow Approach	Alternative 3 Restricted and Closed Areas	Alternative 4 Area and Fishery Specific Approach	Alternative 5 CH Catch Limit Approach
			specific biomass estimates	Mackerel 60% inside 40% outside of each season apportionment GOA cod: option for AMCC zonal approach for GOA Pacific cod.	TAC % allowed inside CH/RFRPA sites = 20% in A+B season combined (15% for A + B singly), 4.5% in C season and 7.5% in D season BS cod: maximum TAC % allowed inside CH = 20% (A), 3.6% (B) AI cod: maximum TAC % allowed inside CH = 20% (A), 48.3% (B) GOA cod: maximum TAC % allowed inside CH = 20% (A), 31.8% (B season)
Other Catch Limits		Daily catch limits: BS pollock 5000 mt GOA pollock 1000 mt BSAI cod 600 mt GOA cod 400 mt BSAI mackerel 300 mt		Platoon management of the Atka mackerel fishery	
Experimental Design	Small scale: Kodiak and Seguam localized depletion testing	Small scale with well defined and manageable objectives	Large scale: 4 sets of restricted/closed areas for comparison	Small scale with well defined and manageable objectives	Small scale: Kodiak and Seguam localized depletion testing

Management Measures	Alternative 1 No Action	Alternative 2 Low and Slow Approach	Alternative 3 Restricted and Closed Areas	Alternative 4 Area and Fishery Specific Approach	Alternative 5 CH Catch Limit Approach
Observer Coverage	No change to current observer coverage requirements	All non-trawl Pacific cod vessels fishing in CH required to have observer.	No change to current observer coverage requirements	No change to current observer coverage requirements	No change to current observer coverage requirements
VMS	Required in BSAI Atka mackerel fishery	VMS required on all vessels fishing for cod in CH		VMS required on all vessels (except those using jig gear) when fishing for pollock, cod, or mackerel.	Required in BSAI Atka mackerel fishery
Registration Requirements	None	Seasonal exclusive area registration	None	Preregistration required for Atka mackerel fishery	None

Table ES-2 Summary of effect of Alternatives 1 through 5 on each resource and impact parameter evaluated.

4.1-7 Steller Sea Lions	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Incidental take/entanglement in marine debris	I	I	I	I	I
Harvest of prey species	I	I	I	I	I
Spatial/temporal concentration of fishery	CS-	CS+	CS+	I	I
Disturbance	I	I	I	I	I
4.1-9 ESA Listed Cetaceans					
Incidental take/entanglement in marine debris	I	I	I	I	I
Harvest of prey species	I	I	I	I	I
Spatial/temporal concentration of fishery	I	I	I	I	I
Disturbance	I	I	I	I	I
4.1-10 Other Cetaceans besides ESA listed Cetaceans					
Incidental take/entanglement in marine debris	I (U for killer whales)	I (U for killer whales)	I (U for killer whales)	I (U for killer whales)	I (U for killer whales)
Harvest of prey species	I	I	I	I	I
Spatial/temporal concentration of fishery	I	I	I	I	I
Disturbance	I	I	I	I	I
4.1-11 Northern Fur Seals					
Incidental take/entanglement in marine debris	I	I	I	I	I
Harvest of prey species	I	I	I	I	I
Spatial/temporal concentration of fishery	CS-	CS-	CS-	CS-	CS-
Disturbance	U	U	U	U	U

4.1-12 Harbor Seals	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Incidental take/entanglement in marine debris	I	I	I	I	I
Harvest of prey species	I	I	I	I	I
Spatial/temporal concentration of fishery	CS-	CS+	CS-	CS-	CS-
Disturbance	I	I	I	I	I
4.1-13 Other Pinnipeds					
Incidental take/entanglement in marine debris	I	I	I	I	I
Harvest of prey species	I	I	I	I	I
Spatial/temporal concentration of fishery	I	I	I	I	I
Disturbance	I	I	I	I	I
4.1-14 Sea Otters					
Incidental take/entanglement in marine debris	I	I	I	I	I
Harvest of prey species	I	I	I	I	I
Spatial/temporal concentration of fishery	I	I	I	I	I
Disturbance	I	I	I	I	I
4.2-4 EBS Pollock					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	I

S = Significant, **C** = Conditional, **I** = Insignificant, **U** = Unknown, **+** = positive, **-** = negative

Shaded cells indicate tradeoffs between alternatives identified in the analysis for that resource for that parameter

Table ES-2 Summary of effect of Alternatives 1 through 5 on each resource and impact parameter evaluated.

4.2-5 GOA Pollock	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	I
4.2-9 EBS Pacific Cod					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	I
4.2-10 GOA Pacific Cod					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	I
4.2-13 BSAI Atka Mackerel					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	I

4.2-14 GOA Atka Mackerel	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Fishing mortality	U	U	U	U	U
Spatial temporal concentration of catch	U	U	U	U	U
Change in prey availability	U	U	U	U	U
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	U	U	U	U	U
4.2-17 BSAI/GOA Flatfish Species					
Fishing mortality	I	I	I	I	I
Spatial/temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability, change in suitability of spawning, nursery. settlement, etc, habitat	I	I	I	I	I
4.2-17 BSAI/GOA Other Flatfish Species					
Fishing mortality	I	I	I	I	I
Spatial/temporal concentration of catch	U	U	U	U	U
Change in prey availability	U	U	U	U	U
Habitat suitability, change in suitability of spawning, nursery. settlement, etc, habitat	U	U	U	U	U
4.2-22 BSAI Pacific Ocean Perch					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	I

S = Significant, **C** = Conditional, **I** = Insignificant, **U** = Unknown, **+** = positive, **-** = negative

Shaded cells indicate tradeoffs between alternatives identified in the analysis for that resource for that parameter

Table ES-2 Summary of effect of Alternatives 1 through 5 on each resource and impact parameter evaluated.

4.2-23 Other BSAI Red Rockfish and Other Rockfish	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	U	U	U	U	U
Change in prey availability	U	U	U	U	U
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	U	U	U	U	U
4.2-24 GOA Rockfish					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	U	U	U	U	U
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	U	U	U	U	U
4.2-26 GOA Thornyheads					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	I
4.2-28 GOA Sablefish					
Fishing mortality	I	I	I	I	I
Spatial temporal concentration of catch	I	I	I	I	I
Change in prey availability	I	I	I	I	I
Habitat suitability: change in suitability of spawning, nursery, or settlement habitat, etc.	I	I	I	I	I
4.2-29 BSAI Squid and Other Species	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Squid	U/U	U/U	U/U	U/U	U/U
Skates	U/I	U/I	U/I	U/I	U/I
Sculpins	U/I	U/I	U/I	U/I	U/I
Sharks	U/U	U/U	U/U	U/U	U/U
Octopi	U/U	U/U	U/U	U/U	U/U
4.2-30 GOA Squid and Other Species					
Squid	U/U	U/U	U/U	U/U	U/U
Skates	U/U	U/U	U/U	U/U	U/U
Sculpins	U/I	U/I	U/I	U/I	U/I
Sharks	U/I	U/I	U/I	U/I	U/I
Octopi	U/U	U/U	U/U	U/U	U/U
4.3-2 BSAI Non-specified Species					
Grenadiers effects on populations	U	U	U	U	U
Grenadiers incidental catch	I	U	I	I	I
Other effects on populations	U	U	U	U	U
Other incidental catch	I	U	I	I	I
Jellyfish effects on populations	U	U	U	U	U
Jellyfish incidental catch	I	CS+	CS+	I	I
Sessile Invert. effect on populations	U	U	U	U	U
Sessile Invert. incidental catch	I	U	I	I	I
Mobile Invert. effect on populations	U	U	U	U	U
Mobile Invert. incidental catch	I	U	I	I	I
Total effect on populations	U	U	U	U	U
Total incidental catch	I	U	I	I	I

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Shaded cells indicate tradeoffs between alternatives identified in the analysis for that resource for that parameter

Table ES-2 Summary of effect of Alternatives 1 through 5 on each resource and impact parameter evaluated.

4.3-3 GOA Non-specified Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Grenadiers effects on populations	U	U	U	U	U
Grenadiers incidental catch	I	I	I	I	I
Other effects on populations	U	U	U	U	U
Other incidental catch	I	CS+	I	I	I
Jellyfish effects on populations	U	U	U	U	U
Jellyfish incidental catch	I	S+	CS+	I	I
Sessile Invert. effect on populations	U	U	U	U	U
Sessile Invert. incidental catch	I	CS+	I	I	I
Mobile Invert. effect on populations	U	U	U	U	U
Mobile Invert. incidental catch	I	CS+	I	I	I
Total effect on populations	I	CS+	I	I	I
Total incidental catch	U	U	U	U	U
Tanner Crab	I	CS+	I	I	I
4.4-2 Forage Fish					
BSAI Smelt effects on populations	I	I	I	I	I
BSAI Smelt incidental catch	I	CS+	I	I	I
BSAI Other effects on populations	I	I	I	I	I
BSAI Other incidental catch	I	I	I	I	I
GOA Smelt effects on populations	I	I	I	I	I
GOA Smelt incidental catch	I	S+	CS+	I	I
GOA Other effects on populations	I	I	I	I	I
GOA Other incidental catch	I	I	I	I	I

4.5-3 BS Prohibited Species Bycatch (Pollock and Pacific Cod)	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Halibut	I	I	I	I	I
Herring	I	CS-	I	I	I
Chinook Salmon	I	CS+	I	I	I
Other Salmon	I	CS+	I	I	I
Red King Crab	I	I	I	I	I
Tanner Crab	I	I	I	I	I
Other Tanner Crab	I	I	I	I	I
Other King Crab	I	CS+	I	I	I
Spatial Temporal Concentration of Bycatch - BSAI All Species	I	I	I	I	I
Prey Competition	I	I	I	I	I
4.5-4 AI Prohibited Species Bycatch (Atka Mackerel)					
Halibut	I	I	I	I	I
Herring	I	CS+	CS+	I	I
Chinook Salmon	CS+	CS+	CS-	CS+	CS+
Other Salmon	I	I	I	I	I
Red King Crab	I	I	I	I	I
Tanner Crab	I	I	I	I	I
Other Tanner Crab	I	CS+	CS+	CS+	I
Other King Crab	I	I	I	I	I
Spatial Temporal Concentration of Bycatch - BSAI All Species	I	I	I	I	I
Prey Competition	I	I	I	I	I

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Shaded cells indicate tradeoffs between alternatives identified in the analysis for that resource for that parameter

Table ES-2 Summary of effect of Alternatives 1 through 5 on each resource and impact parameter evaluated.

4.5-7 GOA Prohib Species Bycatch	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Halibut	I	I	I	I	I
Herring	I	I	I	I	I
Chinook Salmon	I	I	I	I	I
Other Salmon	I	I	I	I	I
Red King Crab	I	I	I	I	I
Tanner Crab	I	I	I	I	I
Other Tanner Crab	I	I	I	I	I
Other King Crab	I	I	I	I	I
Spatial Temporal Concentration of Bycatch - BSAI All Species	I	I	I	I	I
Prey Competition	I	I	I	I	I
4.6-2 ESA Listed Pacific Salmon					
Bycatch - BSAI	I	CS+	I	I	I
Bycatch - GOA	I	CS+	I	I	I
Spatial Temporal Concentration of Bycatch - BSAI	I	I	I	I	I
Spatial Temporal Concentration of Bycatch - GOA	I	CS+	I	I	I
Prey Competition	I	I	I	I	I
4.7-3 Northern Fulmar					
Incidental take–BSAI	U	I	U	U	U
Incidental take–GOA	I	I	I	I	I
Prey availability	I	I	I	I	I
Benthic habitat	I	I	I	I	I
Proc. waste & offal	CS+	I	CS+	CS+	CS+

4.7-3 Short-tailed Albatross	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Incidental take	CS-	CS-	CS-	CS-	CS-
Prey Availability	I	I	I	I	I
Benthic Habitat	I	I	I	I	I
Proc. Waste & Offal	I	I	I	I	I
4.7-3 Other Albatrosses & Shearwaters					
Incidental Take	CS-	CS-	CS-	CS-	CS-
Prey Availability	I	I	I	I	I
Benthic Habitat	I	I	I	I	I
Proc. Waste & Offal	I	I	I	I	I
4.7-3 Piscivorous Seabirds (Also Breeding in Alaska)					
Incidental Take	I	I	I	I	I
Prey Availability	U	U	U	U	U
Benthic Habitat	I	I	I	I	I
Proc. Waste & Offal	I	I	I	I	I
4.7-3 Eiders (Spectacled and Stellers)					
Incidental Take	I	I	I	I	I
Prey Availability	I	I	I	I	I
Benthic Habitat	I	I	I	I	I
Proc. Waste & Offal	I	I	I	I	I

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Shaded cells indicate tradeoffs between alternatives identified in the analysis for that resource for that parameter

4.7-3 Other Seabird Species					
Incidental Take	I	I	I	I	I
Prey Availability	I	I	I	I	I
Benthic Habitat	I	I	I	I	I
Proc. Waste & Offal	I	I	I	I	I
4.8-6 Marine Benthic Habitat	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Removal/damage to HAPC biota by bottom trawl gear	CS-	S+	CS+	CS-	CS-
Removal and damage to HAPC biota by fixed gear	CS-	CS+	CS+	CS-	CS-
Modification of nonliving substrates, damage to epifauna and infauna by trawl gear	CS-	CS+	CS+	I	CS-
Modification of nonliving substrates,	I	I	I	I	I
Habitat subject to change in biodiversity	CS-	CS+	CS+	I	CS-
4.9-3 Predator-prey Relationships					
Pelagic Forage Availability	S+	S+	S+	S+	S+
Spatial and Temporal Concentration	CS-	CS+	CS+	CS+	CS+
Removal of Top Predators	I	I	I	I	I
Introduction of Nonnative Species	CS-	I	I	I	I
4.9-3 Energy Flow and Balance					
Energy Redirection (Discards)	I	I	I	I	I
Energy Removal (Catch)	I	I	I	I	I
4.9-3 Diversity					
Species Diversity	CS-	CS+	CS+	CS+	CS+
Functional (Trophic) Diversity	I	I	I	I	I

4.11-7 Management Complexity and Enforcement Issue					
Compliance with Area Closures	S-	S-	S-	S-	S-
Harvest within Catch Limits	I	S-	S-	S-	S-
Economic Indicators	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Existence Values	CS-	CS+	CS+	CS+	CS+
Non-market Subsistence	CS-	CS+	CS+	CS+	CS+
Non-consumptive Eco-tourism Use	CS-	CS+	CS+	CS+	CS+
Harvests & Fish Prices	CS+	S-	S-	I	CS-
Operating Cost Impacts	CS+	CS-	CS-	CS-	CS-
Groundfish Market Values	CS+	S-	CS-	I	CS-
Safety Impacts	CS-	CS-	CS-	CS-	CS-
Impacts on Related Fisheries	U	U	U	U	U
Costs to Consumers	CS+	CS-	CS-	I	I
Management and Enforcement	I	S-	S-	S-	S-
Excess Capacity	CS-	U	U	U	U
Prohibited Species Catch	I	U	U	U	U

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Shaded cells indicate tradeoffs between alternatives identified in the analysis for that resource for that parameter

Table ES-3 Estimated losses under Alternatives 2 and 4 compared to baseline (Alternative 1) using four socioeconomic indicators.

		Reduction between Alternative 1 and Alternative 2				Reduction between Alternative 1 and Alternative 4			
Region/Indicator		CV Harvest (tons)[1]	Ex-Vessel Value ($)[2]	Payments to Labor ($)[3]	Employment (FTEs)[4]	CV Harvest (tons)[1]	Ex-Vessel Value ($)[2]	Payments to Labor ($)[3]	Employment (FTEs)[4]
All Regions Combined	loss	328 - 587k	87 - 147m	184 - 306m	2,922 - 4,724	2.6 - 49.1k	2.6 - 14.0m	1.7 - 25.4m	15 - 411
	% loss	31 - 55%	36 - 61%	28 - 47%	29 - 48%	0 - 5%	1 - 6%	0 - 4%	0 - 4%
Alaska Peninsula & Aleutian Is. Region	loss	9.8 - 14.3k	70 - 123m	54.5 - 96.8m	1,262 - 2,235	1.5 - 3.2k	1.7 - 10.1m	1.5 - 8.0m	34 - 189
	% loss	55 - 82%	34 - 60%	33 - 60%	33 - 60%	8 - 18%	1 - 5%	1 - 5%	1 - 5%
Kodiak Region	loss	25.4 - 40.9k	15.6 - 22.1m	14.9 - 21.6m	335 - 476	(-0.1)[5] - 4.9k	1.0 - 3.8m	0.5 - 3.3m	2 - 73
	% loss	41 - 67%	50 - 71%	45 - 67%	45 - 64%	0 - 8%	3 - 12%	2 - 10%	0 - 10%
Alaska Southcentral Region	loss	3.4 - 4.8k	1.3 - 1.6m	2.7 - 3.7m	44 - 60	(-0.3) - 0.7k	(-44) - 145k	(-0.2) - 0.4m	(-10) - 4
	% loss	38 - 55%	40 - 49%	30 - 42%	27 - 37%	(-4) - 8%	(-1) - 4%	(-2) - 5%	(-6) - 2%
Alaska Southeast Region	loss	2.9 - 3.6k	0.8 - 1.0m	1.9 - 2.5m	47 - 60	(-0.1) - 0.5k	4.1 - 4.5k	(-5) - 302k	(-2) - 8
	% loss	40 - 50%	38 - 44%	26 - 36%	29 - 38%	(-1) - 8%	0 - 0%	0 - 4	(-1) - 5%
Washington Inland Waters Region	loss	234 - 431k	N.A.[6]	101 - 168m	1,117 - 1,720	1.3 - 31.9k	N.A.	0.1 - 12.3m	32 - 126
	% loss	28 - 52%	N.A.	24 - 41%	23 - 37%	0 - 4%	N.A.	0 - 3%	(-1) - 3%
Oregon Coast Region	loss	33 - 59k	N.A.	4.4 - 7.4m	50 - 82	0.3 - 5.0k	N.A.	84 - 641k	0 - 9
	% loss	36 - 64%	N.A.	39 - 66%	40 - 66%	0 - 5%	N.A.	1 - 6%	0 - 7%

Notes: [1]Total regionally owned catcher vessel harvest (in tons); [2] Total ex-vessel value paid by shorebased processors in the region (in dollars); [3]Total harvesting and processing payments to labor accruing to the region (in dollars); [4]Total harvesting and processing employment accruing to the region (in full-time equivalents); [5](-) denotes a negative loss, that is, an increase in that indicator relative to Alternative 1; [6]N.A. (not applicable) is used because little or no pollock, Pacific cod or Atka mackerel caught off Alaska is delivered to shorebased processors in Washington or Oregon.